8.14 Water Resources

This section provides a discussion of the existing water resources in the vicinity of the Highgrove Project site and assesses the potential effects of project construction and operations on water resources. Specifically, this chapter discusses the project and its potential effects in the following areas:

- Proposed use of groundwater for cooling and process water needs
- Water supply and quality
- Disposal of wastewater
- Compliance with federal, state, and local water policies
- Storm water discharge
- Flooding

8.14.1 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to water resources and conformance are discussed in this section and summarized in Table 8.14-1.

8.14.1.1 Federal

The Clean Water Act authorizes the U.S. Environmental Protection Agency (USEPA) to regulate discharges of wastewater and stormwater into surface waters by issuing National Pollutant Discharge Elimination System (NPDES) permits and setting pretreatment standards. In California, the State Water Resources Control Board, acting through its Regional Water Quality Control Boards, implements these permits consistent with a Memorandum of Understanding with the USEPA. For this reason, relevant NPDES permits are discussed below under State LORS.

8.14.1.2 State

8.14.1.2.1 State Water Resources Control Board and Santa Ana Regional Water Quality Control Board *Industrial Stormwater NPDES Permit* The State Water Resources Control Board (SWRCB) implements regulations under the federal Clean Water Act requiring stormwater discharges associated with industrial activity to be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued a statewide General Permit and Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities (such as the proposed project), excluding construction activities. This is SWRCB Order 97-03-DWQ. To be covered under Order 97-03-DWQ, the project would implement a Stormwater Pollution Prevention Plan (SWPPP) including good housekeeping practices and Best Management Practices (BMPs) during project operation. The Santa Ana Regional Water Quality Control Board (SARWQCB) requires a Notice of Intent to be filed for industrial activities to be covered under the statewide General Permit.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to Highgrove Project Water Resources

LORS	Applicability	How Conformance Is Achieved	Agency/Contact
Federal			
Clean Water Act/Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); National Pollutant Discharge Elimination System (NPDES) (CWA, Section 402)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all point-source discharges, including industrial wastewater and stormwater runoff, during both construction and operation.	NPDES permits for construction and industrial stormwater prior to construction and plant operation.	See below under "State"
State			
Federal Clean Water Act (implemented by State of California) and Porter-Cologne Water Quality Control Act	Implements and enforces the federal NPDES permit program through conformance with beneficial uses and water quality objectives in the Basin Plan, as well as conformance with any applicable Total Maximum Daily Load requirements and industrial pretreatment requirements.	NPDES permits for construction and industrial stormwater prior to construction and plant operation.	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501 951-782-4130
Local			
City of Colton, Section 13.08 of the Municipal Code (Ordinance 0-03-98 § 1)	Sets forth uniform requirements for all users of the Colton wastewater collection and treatment system.	For the discharge of sanitary wastewater, the Highgrove Project will obtain a Connection Permit from the City of Grand Terrace.	Steve Berry Assistant City Manager City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313 (909) 430-2245
San Bernardino Valley Municipal Water District Ordinance No. 73-SARI to be implemented for the Highgrove Project by the City of San Bernardino Municipal Water Department	Plant wastewater will be transported to the Santa Ana Regional Interceptor (SARI) brine line by truck.	The City of San Bernardino Municipal Water Department will issue a conditional Indirect Industrial User Permit and the applicant will use a company that has a Liquid Wastehauler Permit. The applicant also will comply with all waste discharge requirements.	Mike Placentia Environmental Control Section San Bernardino Municipal Water Department 300 North D Street San Bernardino, CA 92418 (909) 384-5141

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to Highgrove Project Water Resources

LORS	Applicability	How Conformance Is Achieved	Agency/Contact
City of Grand Terrace, Grading Permit	Regulates grading, erosion and sediment control for construction projects within City limits.	The applicant will obtain a Grading Permit and the project will comply with all practices prescribed in the Erosion and Sediment Control Plan and SWPPP.	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256

Construction Stormwater NPDES Permit The federal Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. This is SWRCB Order 99-08-DWQ. The proposed project would result in disturbance of more than one acre of soil; therefore, the project will require coverage under the statewide General Permit. This includes the preparation of a SWPPP that would specify site management activities to be implemented during site development. These management activities will include construction stormwater BMPs, dewatering runoff controls, and construction equipment decontamination. The Santa Ana RWQCB requires that a Notice of Intent be filed prior to construction activities, and that the SWPPP be maintained onsite during construction.

Municipal Stormwater NPDES Permit A Municipal Stormwater NPDES Permit Order No. R8-2002-0012, was issued to San Bernardino County and 16 incorporated cities in San Bernardino County (including Grand Terrace) by the Santa Ana RWQCB on April 26, 2002. The municipal permit requires the development and implementation of an effective stormwater management program to protect the beneficial uses of all receiving waters. Because the municipal stormwater standards would be enforced by the City of Grand Terrace, they are discussed below under local regulations.

8.14.1.3 Local

8.14.1.3.1 Industrial Wastewater

Industrial wastewater will be truck-hauled to the SARI brine line, which conveys saline wastewater (high in total dissolved solids) to the Pacific Ocean. The SARI system was constructed to limit the discharge of saline wastewater into the Santa Ana River. In the project area, the "San Bernardino Municipal Water District Ordinance No. 73-SARI" provides regulations for the use of the SARI system. Based on the plant's location, the Highgrove Project must obtain from the City of San Bernardino Municipal Water Department an Indirect Industrial User Permit, including a laboratory analysis of a sample from the proposed discharge and a Liquid Wastehauler permit application to discharge waste at the truck disposal station.

Ordinance No. 73-SARI requires that pretreatment systems reduce pollutants to levels specified by federal and local limitations. Wastewater discharges must be in accordance with the general pretreatment regulations as stated in Section 403.2 of Title 40 of the Federal Code of Regulations. In addition, the ordinance specifies local discharge limits consistent with the operational requirements of the SARI system's NPDES permit with the Santa Ana RWQCB. Table 8.14-2 shows the constituent limits for discharge to the SARI System.

TABLE 8.14-2
Limitations for Industrial Discharges to SARI

Parameter	SARI Discharge Limit (mg/L)
pH	6-12 units
Arsenic	2.0

Cadmium	1.0
Chromium	2.0
Copper	3.0
Lead	2.0
Mercury	0.03
Nickel	10.0
Silver	5.0
Zinc	10.0
Cyanide (total)	5.0
Cyanide (Amenable)	1.0
Polychlorinated Biphenyls	0.01
Pesticides	0.01
Total Toxic Organics	0.58
Sulfide (total)	5.0
Sulfide (dissolved)	0.5
Oil and Grease (petroleum)	100 tph

Sanitary Wastewater Sanitary wastewater will be discharged to the City of Grand Terrace's sewer system, which is operated by the City of Colton. Section 13.08 of the City of Colton Municipal Code sets forth uniform requirements for all users of the Colton wastewater collection and treatment system. Grand Terrace is required by the "Joint Powers Agreement for Pretreatment Program Responsibilities and Authority in the Colton Wastewater Treatment Plant Service Area," dated November 15, 1990, to establish and maintain legal authority within its sewer service area to assure that its ordinance provisions and wastewater discharge limits are as restrictive as those specified by the City of Colton. Because only sanitary wastewater would be discharged, discretionary review in accordance with the provisions of Section 13.08 would not be required. The Highgrove Project will request a connection permit to hook up to the City of Grand Terrace wastewater system (Ethridge, 2006).

Stormwater The Municipal Stormwater NPDES Permit Order No. R8-2002-0012, NPDES Permit No. CAS618036, was issued to San Bernardino County and the 16 incorporated cities of San Bernardino County (including Grand Terrace) by the Santa Ana RWQCB on April 26, 2002. It requires the development and implementation of a Water Quality Management Plan (WQMP) to protect the beneficial uses of all receiving waters.

Under Order No. R8-2002-0012, the San Bernardino County Flood Control District, as the principal permittee for San Bernardino County, was required to develop a model WQMP to reduce pollutants and runoff flows from all new development and significant redevelopment programs. The Highgrove Project falls into the category of "redevelopment," and is thus required to follow the guidelines outlined in the Plan. Guidelines of the WQMP

include steps to identify and mitigate pollutants and conditions of concern. Projects must incorporate and implement best management practices to control erosion and sedimentation during project construction and operations. These requirements are similar to those of the statewide General Permits for construction and industrial activities, and have been incorporated into the draft Storm Water Pollution Prevention Plan contained in Appendix 8.14A.

8.14.1.3.2 Grading The City of Grand Terrace has established an ordinance for grading, erosion, and sediment control. This ordinance establishes permitting requirements and exemptions for general earthwork operations, sediment transport, and erosion control activities that can cause the discharge of pollutants into stormwater systems or watercourses. These requirements, including implementation of best management practices, are similar to those of the statewide General Permit for construction activities. The requirements have been incorporated into the draft Storm Water Pollution Prevention Plan contained in Appendix 8.14A.

8.14.1.3.3 California Energy Commission Policy The California Energy Commission adopted in its 2003 Integrated Energy Policy Report policy guidance on the use of water for power plant cooling. The Highgrove Project is proposing to use onsite wells to meet its small cooling water demands because at this time there is no suitable alternative water supply source available. For a complete discussion of all the alternative water supply sources considered, see Section 9.0, Alternatives.

8.14.2 Hydrologic Setting

8.14.2.1 Surface Water

The City of Grand Terrace, in which the Highgrove Project will be sited, is located in the Santa Ana Region of California's Regional Water Quality Control Boards. The Santa Ana River Basin is the major watershed within this Region. This watershed is divided into the lower Santa Ana River, middle Santa Ana River, Chino basin, upper Santa Ana and Big Bear Lake watersheds. The lower Santa Ana River Basin includes the Orange County drainage areas. The rest of the Santa Ana River Basin includes the San Bernardino County and the Riverside County drainage areas.

Surface waters in the vicinity of the project include the Santa Ana River, Riverside Canal, and Gage Canal. Figure 8.14-1 shows the surface water features in the project vicinity; surface water features that will be crossed by the proposed gas pipeline for the project are described in more detail in Subsection 8.2, Biological Resources.

8.14.2.1.1 Santa Ana River The Santa Ana River, located approximately 1.75 miles west of the site, is the Region's main surface water body, flowing southwest toward the Pacific Ocean, approximately 50 miles away.

The Santa Ana RWQCB divides the River into six "reaches" the project site is located near Reach 4. Although Reach 4 of the Santa Ana River is considered an "impaired water body" (as defined by Section 303(d) of the Clean Water Act) due to pathogens (USEPA, 2002), beneficial uses along the entire Reach include groundwater recharge, water contact recreation, non-water contact recreation, warm freshwater fish habitat, and wildlife habitat (Santa Ana RWQCB, 1994). The Santa Ana River is "effluent-dominated," as treated

wastewater discharges, which total approximately 140,000 acre-feet per year (AFY), comprise more than 90 percent of the baseflow of the Santa Ana River during dry months. Within Reach 4, a portion of flow is provided by discharges from local wastewater treatment plants.

8.14.2.1.2 Riverside and Gage Canals Both the Riverside and Gage Canals are approximately 20 miles in length and are water features with historical significance as they provided irrigation water that helped stimulate economic growth in the vicinity of the project.

Riverside Canal passes the northwest side of the project site. The Riverside Canal is a concrete-lined waterway that flows northeast to southwest from near the City of Colton to the City of Corona. It is currently used primarily as a conveyance for non-potable water for agricultural use. No water quality data are available for Riverside Canal. The Gage Canal is located approximately ½ mile south of the site. The Gage Canal is an irrigation canal between the Santa Ana River and Riverside. The canal supplies water to local citrus ranches and the groves of California Citrus State Historic Park. No water quality data are available for Gage Canal.

8.14.2.2 Groundwater

Extensive groundwater basins underlie much of the Region in the Santa Ana Basin. A map showing the groundwater basins in the vicinity of the project is shown in Figure 8.14-2. The project is location within the Riverside groundwater basin. A recent amendment to the Basin Plan for the Santa Ana Region divided the Riverside Basin into seven subbasins, known as Riverside A through Riverside F (SARWQCB, 2004). The project is located in the basin designated as Riverside F (Figure 8.14-2).

Deterioration of groundwater quality in the Region is a significant issue due to increasing salt levels. The Regional Board has been active, for instance, in helping to develop desalination projects to intercept and desalt poor quality groundwater with the goal of protecting downstream water supplies as well as developing strategies to protect water quality and optimize water resources development.

The Riverside Basin as a whole is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the City of Bloomington. The Santa Ana River flows over the northern portion of the basin (DWR, 2004) and provides some of the recharge for the basin. Other recharge sources include underflow past the Rialto-Colton fault, Chino basin inflows, return irrigation flow, and deep percolation of precipitation. Beneficial uses of the Riverside Basin include municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply (SARWQCB, 1994).

Groundwater in the basin is found mainly in alluvial deposits. Quaternary age alluvial deposits in the subbasin consist of sand, gravel, silt, and clay deposited by the Santa Ana River and its tributaries. The upper 30-foot section of deposits below the site is likely perched groundwater and is composed of clay with silt and sand interbeds with varying density and degree of cementation (ARCADIS, 2000). Based on a March 1999, Phase II Site Assessment, the surface soils at the site are Pleistocene alluvial fan deposits that have been

dissected by the modern drainage courses to form remnant terraces. The deposits include decomposed clay-rich alluvium. Well driller's logs indicate that these materials extend to about 420 feet below the site and rest on granitic rocks that are considered non-water bearing. Subsurface material in the upper 80 feet has been observed to consist of varying densities of silts and sands with occasional pebbles or gravel (Golder Associates, 1999). The aquifer below the site is semi-confined with groundwater occurring at an average depth of approximately 100 feet below ground surface (bgs). Historically, depths to groundwater have ranged from 80 to 120 feet bgs at the project site.

Groundwater in this basin is dominantly calcium-sodium bicarbonate, with ranges from 320 milligrams per liter (mg/L) to 756 mg/L (DWR, 2004). Groundwater quality samples were taken from one of the existing onsite wells and are reported in Table 7.1-2 (Calscience Environmental Laboratories, 2004).

8.14.2.2.1 Santa Ana River Stipulated Judgment In the 1960s, overuse of the Santa Ana River reduced summer flows and water quality to downstream users (Orange County and others), which resulted in a lawsuit seeking to adjudication of water rights against upstream users. The case was settled through an engineered solution (Stipulated Judgment 78426, April 17, 1969), and resulted in an agreement by the four largest water districts -- San Bernardino Valley Municipal Water District (MWD), Chino Basin MWD, Western MWD, and Orange County WD to implement a physical solution. The judgment establishes minimum average annual flows and guaranteed quality (total dissolved solids, or TDS) from the San Bernardino area to and through the Riverside Narrows requirements, as well as flows from the upper basin to the lower basin (Orange County), measured at Prado Dam. The Santa Ana River Watermaster verifies extractions and prepares an annual report to ensure these minimum standards are met. Extraction credits and obligations are tracked against a basis of historical use (defined as the base period from 1959-1963).

Application of the Santa Ana River Stipulated Judgment to the Riverside Basin Unlike the San Bernardino Basin, no safe yield has been established for the Riverside Basin because it has never been limited. Therefore, the Riverside Basin, in which the project is located, is not subject to the adjudication. Instead, extractions are compared by the Watermaster against the historical levels (1959-1963 average) as established in the Judgment. Provided minimum water surface elevations, within the Colton Basin and that portion of Riverside Basin Area within San Bernardino County, are maintained by San Bernardino Valley Municipal Water District, extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County for use within San Bernardino Valley are not limited; and therefore, verification of such amounts are not specifically required by the Judgment. However, because of the interrelated nature of the basin, proper allocation of the total extractions from these areas for use on areas outside San Bernardino Valley necessitates the verification of these extractions.

During the 1959-1963 base period, groundwater extractions by the Highgrove Generating Station, which is now owned by AES and operated as Riverside Canal Power Company, averaged 1,031 acre feet (Western-San Bernardino Watermaster, 2005). This represents about 3.1 percent of the total base period extractions (33,729 acre feet) from the Riverside Basin within San Bernardino County.

The provisions of the Judgment require that Western and San Bernardino Valley provide groundwater replenishment if certain base rights are exceeded. To date, the base rights have not been exceeded. However, if the provisions of the Judgment are not met in the future, then allocations would be made in accordance with the base period extractions—defined as the average usage between 1959-1963. Based on discussions with the local watermaster, there would be no objections to using the onsite wells to serve the expected annual average demand for the new facility of 358 acre-feet since it represents a significantly lower value than historical usage (1,031 acre feet).

Riverside Basin Capacity The provisions of Judgment 78246 are implemented by the Western-San Bernardino Watermaster, who prepares annual reports that summarize extractions from the groundwater basins subject to the Judgment, and the distribution of those extractions to the various service areas. The Watermaster determines the average annual extractions from the Riverside Basin within San Bernardino County for use outside the boundaries of SBVMWD. In addition, although this is not specifically required by Judgment 78426, the Watermaster also verifies extractions from the Riverside Basin for use within San Bernardino County. The Watermaster performs this additional verification to ensure proper allocation of the total extractions from the Riverside Basin for use in areas outside SBVMWD.

Table 8.14-3 summarizes extractions from the Riverside Basin within San Bernardino County for the recent 12-year period of 1992-2003. Extractions in 2003 (totaling 27,143 acre feet) were less than those during the (1959-1963) base period extractions of 33,729 acre feet.

TABLE 8.14-3
Verified Extractions from the Riverside Basin within San Bernardino County (1992-2001), in acre-feet per year

Year	Extracted by San Bernardino County Entities	Extracted by Riverside County Entities*	Total Extractions (Base Period: 33,729)
1992	5,652	16,307	21,959
1993	5,428	16,438	21,866
1994	5,711	13,950	19,661
1995	6,223	17,642	23,865
1996	11,986	14,712	26,698
1997	17,887	12,391	30,278
1998	22,112	10,998	33,110
1999	21,785	13,582	35,367
2000	23,310	12,489	35,799
2001	20,705	10,393	31,098
2002	13,602	14,115	27,717
2003	16,209	10,937	27,143

* Most of this water is used in Riverside County.
Source: Western-San Bernardino Watermaster, 2005

Another of the required determinations is the average static water levels within the Riverside Basin within San Bernardino County. The baseline water level, based on the average 1963 water surface elevations in the 3 reference wells, is 822.04 feet. During 2004, the average of the lowest static water surface elevations at each of the 3 wells was 859.27 feet (Western-San Bernardino Watermaster, 2005). According to the Judgment, extractions in the Riverside Basin within San Bernardino County are not limited, provided the minimum static water surface elevation of 822.04 feet is maintained. Consequently, extractions have not been limited in the project area because the actual water surface elevation has remained higher than the specified minimum. SBVMWD is required to ensure that the minimum static water surface elevation is maintained.

8.14.2.3 Flooding Potential

The plant site is not located within a flood hazard zone as defined by the Federal Emergency Management Agency (Figure 8.14-3) (FEMA, 1997).

8.14.3 Water Use and Disposal

8.14.3.1 Water Use

Based on a maximum expected capacity factor of 30 percent, the Highgrove Project is expected to use an average of 358 acre-feet per year for potable, process, and landscape irrigation water needs (based on an annual average temperature during peaking operation of 80°F). The instantaneous, or steady-state, flow corresponding to this condition is approximately 737 gpm. Of the 358 acre-feet per year water use, approximately 60 percent (or 209 acre-feet per year) is used for power plant cooling. On a peak summer day (at an ambient condition of 97°F), the instantaneous water consumption for process water needs is expected to be 854 gpm. These water consumption figures assume all CTGs are operating at 100 percent load. Potable water demands are estimated to average 4.0 gpm, or approximately 2 acre-feet per year.

This information is also provided in the water balance diagrams in Section 7.0, Water Supply (Figures 7.1-2a and 7.1-2b). For a more detailed description of water uses, please see Section 2.2.7, Project Description, and Section 7.0, Water Supply. A discussion of water supply alternatives is addressed in Section 9.0, Alternatives.

8.14.3.2 Wastewater Discharges and Disposal

This section describes wastewater discharges from plant processes (cooling tower blowdown), plant drains, and domestic use. Most of the wastewater generated by the project would be from cooling tower blowdown. A portion of the concentrated cooling water would be removed from the cooling tower via blowdown to prevent mineral scale formation on heat transfer surfaces. When operating at 6.5 cycles of concentration, the volume of blowdown is expected to be about 42 acre-feet per year under annual average climatic conditions and about 98 gpm under maximum daily climatic conditions. The blowdown would be combined with discharge from the plant drain system and trucked offsite to the Santa Ana Regional Interceptor (SARI) pipeline system.

Miscellaneous general plant drainage would consist of cleanup, sample drainage, equipment leakage, and drainage from facility containment areas. Water from these areas

would be collected in systems of floor drains, sumps, and pipes within the facility and discharged to an oil/water separator. The oil-free discharge water would be combined with the cooling tower blowdown and trucked offsite to the SARI pipeline. An average flow of 2 gpm and a peak flow of 5 gpm are projected for these plant service water uses. Potable water from the Riverside Highland Water Company would be used for these purposes.

Sanitary wastewater would be discharged to the City of Grand Terrace's sewer system by interconnecting to an existing pipeline in Taylor Street adjacent to the site. Sanitary wastewater includes wastewater from sinks, toilets, showers and other sanitary facilities. The sanitary wastewater flow would average about 2.0 gpm (2,880 gpd on a 24-hour basis) and the City has indicated that it can accommodate the minimal amount of sanitary wastewater.

The SARI line is a regional brine interceptor that was constructed to protect water quality in the Santa Ana River. The SARI line conveys industrial brine and low quality/high TDS wastewater from the Inland Empire to the Orange County Sanitation District's Plant No. 2, where it is treated and discharged to the ocean via an ocean outfall. The Santa Ana Watershed Project Authority (SAWPA) is the regional entity charged with operating the SARI line; direct or indirect connections to the SARI for private users must be made with the local agency who establishes fees for their portion or lateral pipeline of the SARI line. For the Highgrove Project, wastewater would be transported by truck to the nearest truck dump station, which is located at the San Bernardino Water Reclamation Plant, approximately 5 miles northeast of the project site. Permits for truck disposal and payment of disposal fees will be coordinated through the City of San Bernardino Municipal Water Department. The SARI line is designed to convey up to 30 million gallons per day (mgd) to Orange County Sanitation District and currently conveys flows of 9.7 mgd northeast the Orange County border. This indicates excess capacity in the SARI system (Kennedy/Jenks Consultants, 2006). For reference, the Highgrove Project's discharge of up to 103 gpm (combined process and drain flows) would result in adding 0.1 mgd to the SARI line.

Table 8.14-4 provides the estimated average and maximum daily and average annual water discharge rates for process wastewater (including from plant drains) and sanitary wastewater.

TABLE 8.14-4
Average and Maximum Daily and Average Annual Water Discharge Rates*

		Daily Discharge (gpm)		
Waste Discharge Stream	**Discharge Location**	**Average**	**Maximum**	**Annual Discharge (AFY)**
Plant process wastewater	SARI Line	88	103	42
Sanitary sewage	City sewer system	2	3	1

* Average annual use is equal to the average daily water use multiplied by the number of hours the plant would operate per year under the base operating scenario. See Chapter 2 for a full description of the operating parameters

gpm = gallons per minute
AFY = acre-feet per year

8.14.4 Precipitation, Stormwater Runoff, and Drainage

8.14.4.1 Precipitation

Most of the precipitation in the project area falls between November and April. Monthly average rainfall at the Riverside Municipal Airport, which is similar to that at the project site, is presented in Table 8.14-5. The total annual average rainfall at the Riverside Municipal Airport is 9.95 inches.

TABLE 8.14-5
Average Monthly Rainfall near the Proposed Project Site (2001 to 2005)

Precipitation	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	9.95	1.81	3.72	1.10	0.62	0.09	0.01	0.03	0.00	0.01	0.78	0.70	1.09
Maximum		6.04	6.48	2.95	1.43	0.24	0.03	0.14	0.00	0.06	2.55	1.20	2.13
Minimum		0.01	0.04	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.32

Average Monthly Rainfall at Riverside Municipal Airport approximately 6 miles from project site.

8.14.4.2 Stormwater Runoff Prior to Construction

The Highgrove Project will be located mostly on a former oil tank farm site (the Tank Farm Property), located north of the former Highgrove Generating Station. The Tank Farm Property included berms to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade inside the bermed area. The current "runoff rate" from that portion of the project area within the berms (approximately 6.55 acres) is approximately 10.1 cubic feet per second (cfs) based on an undeveloped site with prior industrial use and a 100-year rainfall intensity. However, since this site is a bermed area, the stormwater does not actually run off the site but stays within the berms until it evaporates. Additional runoff from the Tank Farm Property (outside of the bermed area) flows either into the bermed area or to an existing storm drain on the west side of the property. The project also includes demolition of the existing Highgrove Generating Station and use of that property for construction laydown. Runoff from the Generating Station Property generally flows to the west toward the Cage Park Property pond or to the storm drains on the western part of the Tank Farm Property. The Cage Park Property pond was used as a detention basin during operation of the Highgrove Generating Station, and received water from various plant and non-plant sources. Ultimately, all stormwater runoff from the site (outside of the bermed area on the Tank Farm Property) flows to the Santa Ana River. The Generating Station Property (approximately 10.1 acres) has a runoff rate of approximately 36.5 cfs, for the developed site and a 100-year rainfall intensity.

8.14.4.3 Storm Runoff after Construction

Implementation of the project will alter existing drainage patterns. After construction, the rate of stormwater runoff would increase because of increased impervious surfaces, and would be directed to a detention pond via sheet flow with no curb and gutter. Figure 8.14-4 shows the post-construction runoff and drainage patterns. The total stormwater runoff rate for the area of the Project Site that sits below the street grade would be approximately 23.51 cfs at a 100-year rainfall intensity. Assuming a 10-year storm (4.31 inches of rain in a 24-hour period), the developed Project Site would generate a volume of 1.6 acre-feet of

water. The planned onsite detention basin has been designed to contain this volume. Stormwater calculations are attached as Appendix 8.14B.

Following demolition of the existing Highgrove Generating Station and use of that property for construction laydown, runoff from the southern portion of the site would continue to drain to the west toward the Cage Park Property and/or the widened Taylor Street stormdrain system. Following completion of construction activities, this portion of the project area is expected to have a drainage rate of 15.6 cfs at a 100-year rainfall intensity. This is less than the existing drainage rate because the impervious surfaces associated with the Highgrove Generating Station would be removed. However, final grading of the site will depend on the City Redevelopment Agency, who will become the new owner.

8.14.5 Effects on Water Resources

Significance criteria are derived from the CEQA Appendix G checklist. The project is considered to have a potentially significant effect if it would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite or in flooding on- or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.

8.14.5.1 Surface Water

There are no significant natural surface waters in the project vicinity. The project would not substantially alter existing drainage patterns. Therefore, the project would cause no substantial erosion or siltation on- or offsite. Similarly, the volume and rate of runoff from the project site would not be substantially altered as a result of project development, nor would the project alter the course of any stream or river. The project would capture and

detain stormwater runoff in an onsite detention basin, so the project would not exceed the capacity of existing or planned stormwater drainage systems.

8.14.5.2 Groundwater

As described above in Section 8.14.2.2, annual reports by the Western-San Bernardino Watermaster show that groundwater extractions in the project area are not limited according to the provisions of Judgment 78426, and total extractions are below the base level. In other words, there are no limits on groundwater production based on the Judgment 78426 and pumping up to the base amount would be approved (Steve Mains, 2006).

The main source of process and make-up water would be groundwater from an onsite well. As described in Section 8.14.3.1, the amount of water required for plant processes is 358 AFY. Based on the 2004 total extractions from the Riverside Basin for use within San Bernardino County, the water supply needed for the project represents approximately 1.3 percent of the total extractions. Compared to the 1959-1963 base conditions established pursuant to Judgment 78426, this percentage falls to approximately 1.1 percent. Both percentages are less than the 3.1 percent contribution of extractions by the Riverside Canal Power Company during the base condition years.

Use of Riverside Basin groundwater will continue in the future. Most of the Riverside Basin is within Riverside County, with major groundwater users such as the City of Riverside. Groundwater from both the San Bernardino (Bunker Hill) Basin and the Riverside Basin are the primary source of potable water supply for the Riverside Public Utilities' service area (Riverside Public Utilities, 2004).[1] The Urban Water Management Plan, published by the City of Riverside Public Utilities Department most recently in 2004, has projected total use through 2030. Total water use is expected to increase from a 2005 level of 77,529 AFY to a 2030 level of 101,499 AFY, reflecting a planned increase in population from a 2005 level of 255,346 people to a 2030 level of 329,001 people. Water supplies are expected to grow to 116,421 AFY. Some of the increase in water supply would come from new groundwater development in Downtown Riverside, but Riverside Public Utilities would not pump water from the Riverside Basin in excess of the 1959-1963 historical use described in Judgment 78426.

Within the local area, groundwater is extracted from the Riverside Basin primarily by Riverside Highland Water Company (the potable water provider for the City of Grand Terrace) and by the City of Riverside, Department of Public Utilities. The closest active production well to the onsite wells is State Well No. 2S4W06R01 (also known as RN #7) operated by Riverside Highland Water Company. This well is located near the northwest corner of Main Street and Taylor Road, approximately 1,200 feet south of the Highgrove Project site. Well RN #7 provides potable water (over 1,000 acre-feet in 2002) to Riverside Highland Water Company customers. The Riverside Department of Public Utilities has 8 wells within 1 mile of the project site, 4 of which are operational (DeBerry, Van Buren #1, Van Buren #2, and Electric Street). The DeBerry, Van Buren #1, and Van Buren #2 wells are located northeast of the project site in San Bernardino County, and the Electric Street well is

[1] Groundwater from the San Bernardino Basin and the northern portion of the Riverside Basin (within San Bernardino County) are imported to the Riverside Public Utilities service area by various pipelines. Additionally, the City of Riverside has benefited in recent years by additional imports from the San Bernardino Basin; high groundwater levels have required excess pumping to avoid property damage.

located southwest of the project site in Riverside County. Water pumped from these wells is discharged into pipelines that transport the water to the Riverside Public Utilities service area. Riverside Public Utilities' non-operational Highgrove #1, Highgrove #2, Highgrove #3, and Center Street wells are located southeast of the project site in Riverside County.

Based on a review of data provided by Riverside Highland Water Company, which includes water level data (Riverside Highland Water Company, 2006a) and the Drinking Water Source Assessment (Riverside Highland Water Company, 2006b) of the well, a transmissivity value for RN #7 is estimated to be on the order of 300,000 gallons per day per foot (gpd/ft). This value, although high, is generally consistent with sand and gravel aquifers (Todd, 1980). The screened interval for RN#7 is approximately 300 feet and the well taps the shallowest groundwater (Riverside Highland Water Company, 2006b). Although the screened interval of the onsite Well #1 (State of California Well No. 2S4W06J01) is not known, it is estimated to be on the order of 100 feet based on the total boring depth of 184 feet and available water levels measured in the 1950s. Based on these screen lengths, the transmissivity value of Well #1 is estimated to be 100,000 gpd/ft.

Based on a peak day demand of 854 gpm for the facility, the estimated drawdown at RN#7, which is located approximately 1,200 ft south of Well #1, is estimated to be 1 foot or less. Because both RN#7 and Well #1 are older wells, lithologic logs are not available. However, based on a review of the lithologic logs of City of Riverside wells Highgrove #2 and #3, which are located approximately 600-700 feet southeast of RN #7, it appears that much of the production from RN#7 is a result of a relatively shallow, more highly transmissive section of the aquifer consisting of sands and gravels. This would mean the drawdown at RN #7 may be less than that estimated above.

The impact or drawdown expected at the nearby City of Riverside wells is likely negligible. The current status and well construction details for the wells are provided via various email communications by the City of Riverside (2006).

- Two municipal wells that are active, Van Buren #1 and Van Buren #2, located 1,900 feet and 1,400 feet northwest of Well #1, respectively, are completed deeper than the onsite well, so impact should be minimal, if any.
- DeBerry, an active municipal well, is completed slightly deeper than Well #1; however, because it is located almost 4,000 feet northeast of the onsite well, the impact is expected to be minimal, if any.
- Electric Street, also an active municipal well, is completed at similar depths as Well #1; however, because it is located more than 1 mile southwest of the onsite well, the impact is expected to be minimal, if any.
- Four agricultural wells, Highgrove #1 to #3 and Center Street, located between 2,000 and 4,000 feet southeast of Well #1, are out of service or inactive.

To minimize groundwater use, the project would recover wastewater sources from other uses within the plant and use these sources as water supply to the cooling tower. In addition, the cooling tower water, concentrated through evaporative cooling losses, would be operated at high cycles of concentration to minimize blowdown and limit makeup water needs.

During construction of the project, water will be required primarily for dust suppression. This water will be supplied either by onsite wells or from Riverside Highland Water Company. Because of the short duration of construction activities and the relatively limited water requirements of the construction phase of the project, no significant adverse impacts to water supply are expected to result.

8.14.5.3 Stormwater

Development of the site would change the general slope and aspect, and drainage would be conveyed to an onsite detention pond. The detention pond, shown in Figure 8.14-4, will be configured and sized to retain onsite drainage for a 10-year, 48-hour storm; this will be confirmed during the detailed, final design stage of the project.

Implementation of BMPs during construction and operation would be sufficient to control offsite runoff and prevent offsite sedimentation. During construction and operation, BMPs documented in the SWPPP for erosion and sediment control would be implemented to avoid polluting surface waters. BMPs include designating locations of vehicle parking and maintenance, waste disposal areas, silt fencing, and installation of oil-water separators to prevent pollutants from entering the stormwater system. The project would have no offsite discharges to surface water and, therefore, would not violate water quality standards or waste discharge requirements nor substantially degrade water quality.

To ensure that stormwater from the Highgrove Generating Station Property is not discharged into the Cage Park Property during demolition or construction staging, the construction SWPPP will include measures to detain any excess runoff on the laydown site. This could include a temporary detention basin at the south end of the site. The SWPPP also will include measures to ensure that stormwater does not penetrate the existing groundwater wells located in the laydown area.

8.14.5.4 Water Quality

Local surface water and groundwater quality would not be affected by the project. All process wastewater would be directed to the SARI system and would meet regulatory standards for industrial discharges to the truck disposal station (Table 8.14-6). Sanitary wastes would be sent to the City of Grand Terrace's sanitary sewer system. Water quality effects from stormwater runoff are addressed above in Section 8.14.5.3.

TABLE 8.14-6
Discharge Water Quality

Constituent	Influent (mg/L)	Effluent (mg/L)	SARI Discharge Limit (mg/L)
Arsenic	0.000637	0.004	2.0
Cadmium	Not Detected	Likely 0[a]	1.0
Chromium	Not Detected	Likely 0[a]	2.0
Copper	0.00159	0.01	3.0
Lead	Not Detected	Likely 0[a]	2.0
Mercury	Not Detected	Likely 0[a]	0.03
Nickel	0.00182	0.01	10.0

TABLE 8.14-6
Discharge Water Quality

Constituent	Influent (mg/L)	Effluent (mg/L)	SARI Discharge Limit (mg/L)
Arsenic	0.000637	0.004	2.0
Cadmium	Not Detected	Likely 0[a]	1.0
Silver	0.00736	0.04	5.0
Zinc	Not Detected	Likely 0[a]	10.0
Cyanide (total)	Not Detected[b]	Likely 0[a]	5.0
Cyanide (Amenable)	Not Tested[c]	-	1.0
Polychlorinated Biphenyls	Not Detected	Likely 0[a]	0.01
Pesticides	Not Detected	Likely 0[a]	0.01
Total Toxic Organics	Not Detected	Likely 0[a]	0.58
Sulfide (total)	Not Detected	Likely 0[a]	5.0
Sulfide (dissolved)	Not Tested	-[d]	0.5

[a] This constituent was not detected in onsite well water, either because it was not present in the sample or was present at concentrations below the detection limit. In either case, the discharge standard is likely to be met.

[b] Cyanide was not tested in the AES Highgrove wells. Cyanide was not detected in recent testing of Riverside Highland Water Company Well RN #7, located about 1,200 feet south of the onsite well.

[c] Because total cyanide was not detected in Riverside Highlands Water District Well RN #7, amenable cyanide likely would also be not detected.

[d] Because total sulfide was not detected, dissolved sulfides would likewise be absent or close to a concentration of 0 mg/L.

No areas of pollution/plumes for the Riverside Basin were identified either in the Riverside Highland Water Company Water Supply Assessment of the *Final Environmental Impact Report for the Outdoor Adventures Center Specific Plan* (Lilburn Corporation, 2004) or the Drinking Water Source Assessment for RN #7 (Riverside Highland Water Company, 2006b). However, the Drinking Water Source Assessment for RN #7 (Riverside Highland Water Company, 2006b) discusses the well's vulnerabilities to the following activities:

- Automobile – Repair shops
- Farm chemical distributor/application service
- Fleet/truck/bus terminals
- Home manufacturing
- Machine shops
- Utility stations – maintenance areas
- Wood/pulp/paper processing and mills
- Automobile – Gas stations
- Metal plating/finishing/fabricating
- Underground storage tanks – Confirmed leaking tanks

Because of the proximity of the Highgrove Project wells to RN #7, the onsite well can be expected to be vulnerable to the same activities.

Based on water quality data reported for RN #7 between 2003 and 2005, nitrate appears to be the only potential water quality issue. The Riverside Highland Water Company reported nitrate values ranging from 17 to 29 milligrams per liter (mg/L) (Riverside Highland Water Company, 2006c). The Maximum Contaminant Level (MCL) for nitrate is 45 mg/L (reported as nitrate). Based on water quality data provided by the City of Riverside (2006), nitrate appears also to be an issue for several of the City's wells: Van Buren #1 (2 to 15 mg/L), Van Buren #2 (4 to 17 mg/L), DeBerry (5 to 20 mg/L), Electric Street (as high as 60 mg/L), and Center Street is noted to have been "…capped due to high nitrate." Nitrate appears to be an ongoing issue within the local area; pumping the onsite well is not expected to negatively impact the nitrate situation.

No detections of volatile organic compounds (VOCs), including methyl tertiary butyl ether (MTBE); unregulated organic chemicals; and perchlorate are reported in RN #7. However, low levels (below MCLs) of VOCs are reported in two of the wells operated by the City of Riverside, Van Buren #1 (tetrachloroethylene [PCE]) and Electric Street (trichloroethylene [TCE] and PCE). The MCLs for PCE and TCE are both 5 micrograms per liter. However, because of the deeper well completion of Van Buren #1 and the relatively large distance (more than 1 mile apart) between the onsite well and Electric Street, the potential for mobilizing the low levels of VOCs is minimal.

8.14.5.5 Flooding Potential

The project is not located in the 100-year floodplain defined by FEMA (see Figure 8.14-3). Therefore, it would not place housing or structures in the 100-year flood hazard area, nor place structures that would impede or redirect flood flows.

The project would convert approximately one-half of the developed project area to impervious surfaces. An onsite stormwater detention pond would be used to contain stormwater runoff within the bermed area.

There are no significant dams or levees in the project vicinity. Therefore, the project would not expose people or structures to significant risk of loss, injury or death resulting from a levee or dam failure. Similarly, the project is located approximately 50 miles from the Pacific Ocean, and any potential inundation from seiche, tsunami, or mudflow is remote.

8.14.6 Mitigation

Implementation of the Highgrove Project with the following measures would effectively reduce impacts to ground or surface water to less-than-significant.

- In accordance with regulatory requirements to prepare a SWPPP and an Erosion and Sediment Control Plan, the project would implement BMPs during construction and operation to avoid contamination of any groundwater or surface waters.

8.14.7 Proposed Monitoring Plans and Compliance Verification Procedures

Routine monitoring and compliance verification would be required as part of the stormwater NPDES permitting of the project. The Applicant would be required to prepare a SWPPP specifying BMPs, monitoring and compliance measures to avoid adverse impacts to water quality. This would occur for both the construction phase and for long-term project

operations. No additional monitoring of surface or groundwater would be required because no water quality impacts are expected to occur.

8.14.8 Cumulative Impacts

Cumulative impacts to water resources could occur through the use of groundwater, the contribution of sanitary wastewater, or stormwater runoff. None of these categories of water use is expected to result in significant cumulative impacts to area water resources:

- **Surface Water:** The project area is relatively flat and there are no natural surface water features in the vicinity. Implementation of BMPs during construction and operation would avoid the potential for adverse impacts to surface water from the project.
- **Plant Sewage**: The proposed plant will generate 1 AFY of sanitary wastewater that would be discharged to the City of Colton Wastewater Treatment Plant. The cumulative impacts from this additional waste load would not be significant.
- **Industrial Discharge**: The proposed plant will generate 42 AFY of industrial discharge that would be truck-hauled to a SARI disposal station. The cumulative impacts from this additional waste load would not be significant.
- **Groundwater**: The project's groundwater requirements of 358 AFY are a very small portion of the overall water demands from the Riverside Basin and would not be significant and, therefore, would cause no adverse impacts to groundwater resources.
- **Stormwater**: Implementation of the project would increase runoff on up to 9.8 acres, due to impervious surfaces. The impacts of the increased runoff will be mitigated through the use of an onsite stormwater detention pond designed to contain the discharge of stormwater.

8.14.9 Permits Required

Water quality permits required for the project include the following:

- RWQCB construction activity NPDES stormwater permit, general permit
- RWQCB general industrial NPDES stormwater permit, general permit
- Waste discharge permit for disposal of sanitary wastewater
- Indirect connection permit for disposal of industrial wastewater
- Liquid wastehauler permit for transport of industrial wastewater to SARI
- City of Grand Terrace, grading permit

8.14.10 Agency Contacts

Agency contacts and required permits are listed in Table 8.14-7.

TABLE 8.14-7
Permits and Permitting Agencies for Highgrove Water Resources

Permit	Schedule	Agency
NPDES General Permit for Stormwater discharges associated with Construction Activities	Submit Notice of Intent 30 days prior to start of construction	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501

TABLE 8.14-7
Permits and Permitting Agencies for Highgrove Water Resources

Permit	Schedule	Agency
		951-782-4130
NPDES General Permit for stormwater discharges associated with Industrial Activities	Submit Notice of Intent 30 days prior to start of operation	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501 951-782-4130
Connection Permit for disposal of sanitary wastewater	Hookup permit will be issued and fees collected during the building permit process	Richard Shields Building Official City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313 (909) 430-2250
Indirect Connection Permit for disposal of Industrial Wastewater	Submit application 60 days prior to the date upon which any discharge would begin	Western Municipal Water District 450 Alessandro Blvd Riverside, CA 92508 (951) 789-5000
Liquid Wastehauler Permit for transport of Industrial Wastewater to SARI	Submit application 60 days prior to the date upon which any discharge would begin	Western Municipal Water District 450 Alessandro Blvd Riverside, CA 92508 (951) 789-5000
City of Grand Terrace, Grading Permit	Submit application 90 days prior to construction	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256
Application of Service for Potable Water		Riverside Highland Water Company 1450 E. Washington Street Colton, CA 92324 Contact: Don Hough, General Manager (909) 825-4128

8.14.11 References

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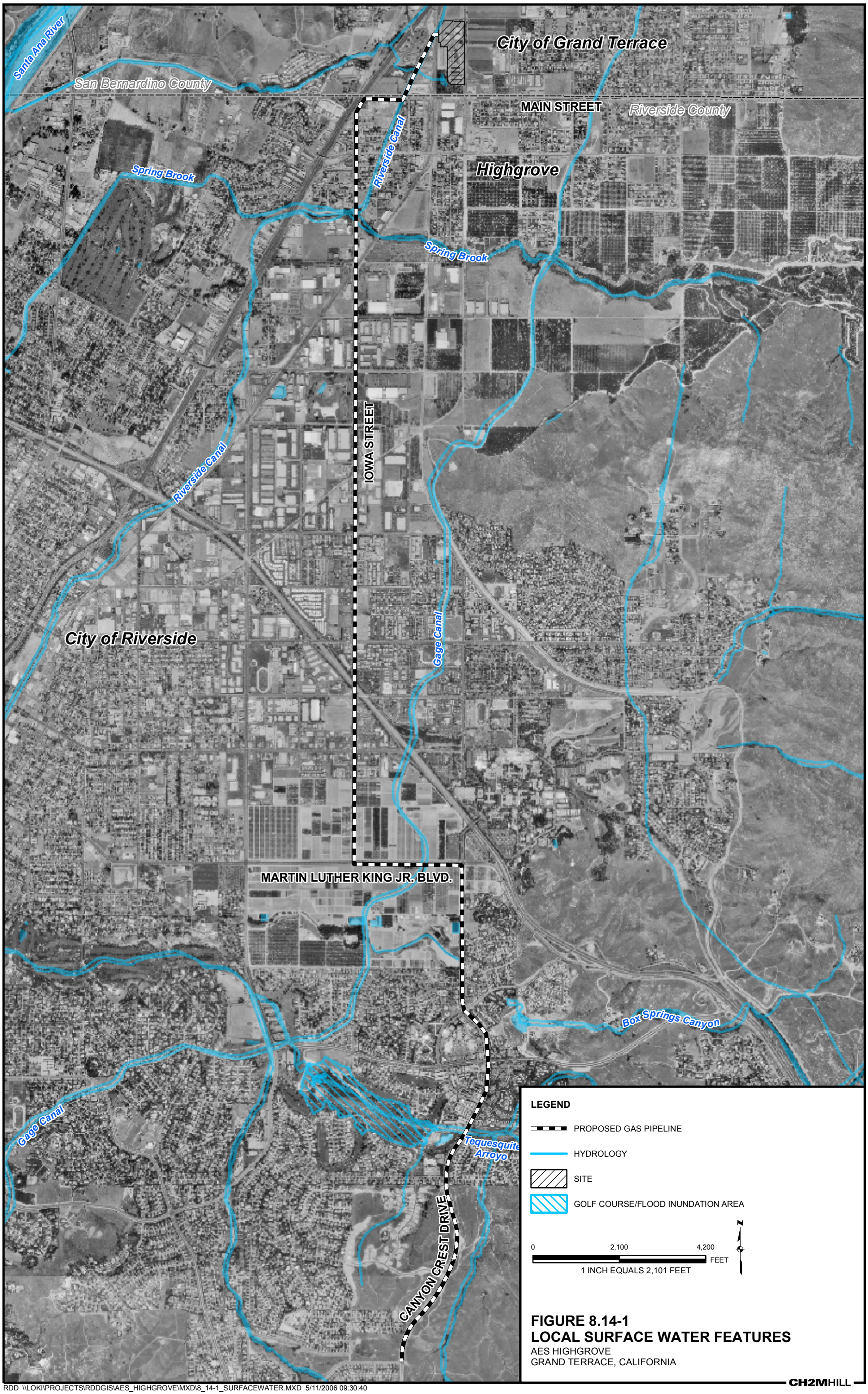

FIGURE 8.14-1
LOCAL SURFACE WATER FEATURES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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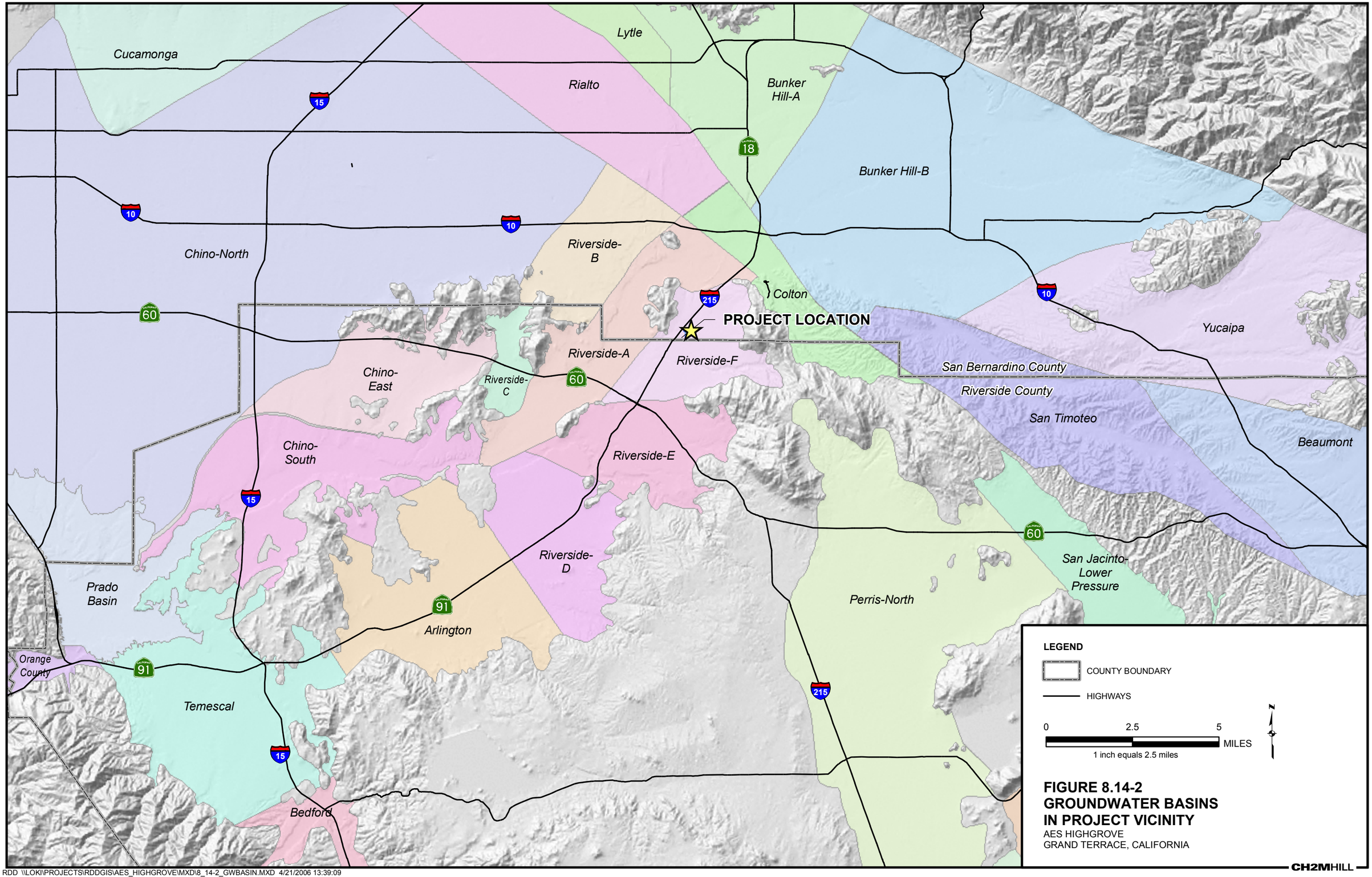

FIGURE 8.14-2
GROUNDWATER BASINS IN PROJECT VICINITY
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

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City of Grand Terrace

San Bernardino County

MAIN STREET

Riverside County

Highgrove

IOWA STREET

City of Riverside

MARTIN LUTHER KING JR. BLVD.

CANYON CREST DRIVE

LEGEND

SITE

PROPOSED GAS PIPELINE

ZONE

A	AN AREA INUNDATED BY 100-YEAR FLOODING; BASE FLOOD ELEVATIONS ARE NOT DETERMINED.
D	AN AREA OF UNDETERMINED BUT POSSIBLE FLOOD HAZARDS
X500	AN AREA INUNDATED BY 500-YEAR FLOODING; AN AREA INUNDATED BY 100-YEAR FLOODING WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; OR AN AREA PROTECTED BY LEVEES FROM 100-YEAR FLOODING.

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.14-3
100-YEAR FLOODPLAIN MAP
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

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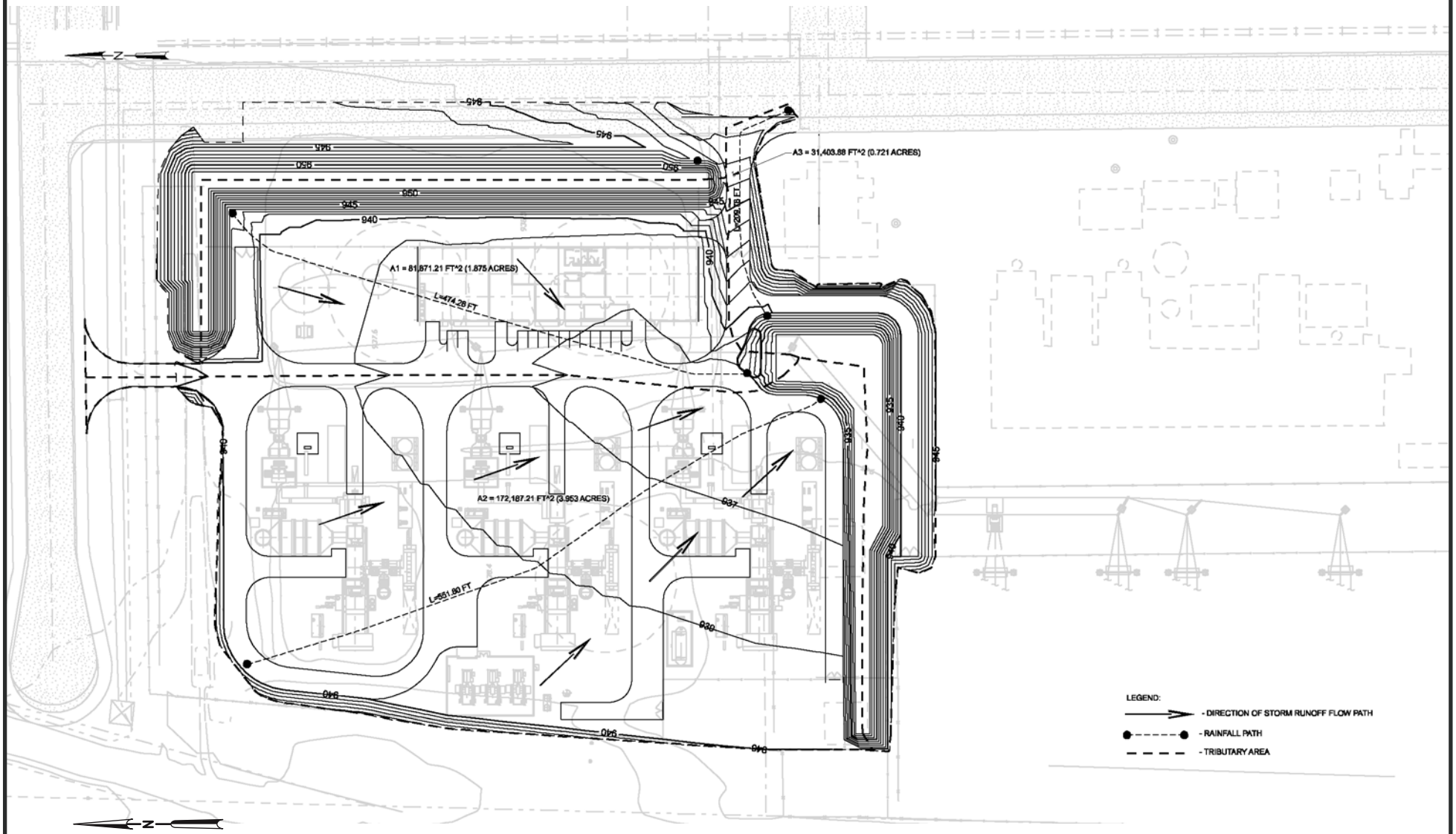

FIGURE 8.14-4
PROPOSED DRAINAGE FACILITIES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

IS032006003RDD_17 (5/8/06)

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